SAMPLING PLAN

12th Street Landfill Site
Wilmington, New Castle County, Delaware

TDD No. 9907-03B
Contract No. 68-S5-3002

1.0 INTRODUCTION

On 13 December 1999, Roy F. Weston, Inc. (WESTON®), Site Assessment Technical Assisstance (SATA) team was directed by U.S. Environmental Protection Agency (EPA) Region III Removal Response Section On-Scene Coordinator (OSC) Mike Towle to conduct additional sampling at the 12th Street Landfill Site, Wilmington, New Castle County, Delaware, to aid in the ecological assessment needed to support the environmental risk assessment.

Additional sediment and soil samples will be collected at the site in order to further delineate the extent of contamination on and off site. Analytical results will be used to support the EPA's decision to initiate a removal action at the site if the results indicate a threat is posed to the surrounding environment.

2.0 SITE DESCRIPTION

2.1 Location

The 12th Street Landfill Site (Site) is located in Wilmington, New Castle County, Delaware, as seen in Figure 1, Site Location Map (Streets Plus, 1997). The approximate site coordinates are 39° 44' 15" north latitude and 75° 31' 35" west longitude (USGS, 1987).

2.2 Site Description

The 12th Street Landfill Site is located in an industrial area on 12th Street, west of the Interstate-495 12th Street exit ramp, near Gander Hill Prison in Wilmington, New Castle County, Delaware. The Site consists of two land parcels. Parcel 19 (which contains the area of concern) is bordered to the west by Brandywine Creek, to the north by Asset Recovery Services, and to the east and south by state of Delaware owned land (parcel 14). Parcel 14 is bordered to the north by Gander Hill Prison, to the northeast by a Norfolk & Southern railroad yard, to the east and southeast by Norfolk & Southern railroad tracks (Shellpot Branch), and to the west by the Brandywine Creek and parcel 19 (see Figure 2, Site Plan) (Ticor, 1999).

Julius Wemman previously owned parcel 19 until 1926. Between 1926 and 1930 the parcel was owned by the mayor and city council of Wilmington. The Wilmington Economic Development Corporation owned the parcel from 1930 to 1987. This parcel is presently owned by the city of Wilmington. George W. Talley previously owned parcel 14 until 1887. Between 1887 and 1971, the parcel was owned by the Philadelphia, Baltimore, and Washington Rail Road Company. This parcel is presently owned by the state of Delaware Department of Transportation. There is no information on what the parcels were utilized for during previous ownerships (Ticor, 1999). Apparently, the area of concern (AOC) was utilized as an unauthorized dump site, in which at least 14 55-gallon drums, rubber hoses, slag, and a light colored ash-like material were disposed of

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Fig. 2

on the property. The company suspected of dumping, Electric Hose and Rubber, operated out of the Brandywine Industrial Complex located adjacent to the Site and ceased operations in 1977 (Breslin).

The Site is relatively flat, with an average elevation of approximately 10 feet above sea level. The AOC is bounded to the west by the Brandywine Creek, which flows into the Christina River downstream of the Site. The Brandywine Creek has its headwater in the Piedmont Plateau in Pennsylvania, which defines the border between Chester County and Delaware County in Pennsylvania and enters Delaware just north of Beaver Valley. The creek meanders through Wilmington until it joins the Christina River which then joins the Delaware River southeast of Wilmington (Wik, 1996).

The water supply for the Wilmington area is obtained from a surface water intake located 4,800 feet upstream of the Site along the Brandywine Creek (SATA, 1999a).

During the first phase of the removal assessment, both parcels were covered with thick vegetation consisting of tall phragmites and deciduous trees. Two drum cluster areas were identified. One drum cluster area is located in the northwestern area of parcel 19 adjacent to the Brandywine Creek (northwest side of the AOC). The second drum cluster area is located in the center of parcel 19 (southern side of the AOC).

2.3 Climate

The annual average temperature in Wilmington is 54.6°F. The average monthly temperatures range from 35°F in January to 76°F in July. The average annual precipitation for Wilmington is 44.38 inches. The average monthly precipitation ranges from 2.72 inches in February to 5.34 inches in August. The mean annual lake evaporation for the site area is approximately 35 inches. The net annual precipitation for the site area is approximately 9.38 inches. A two-year, 24-hour rainfall will produce approximately 3.3 inches of rain (NOAA, 1993).

2.4 Topography and Surface Water

The Site consists of two parcels totaling approximately 20 acres and is heavily vegetated. The area of concern (AOC) is approximately 3 acres in size. The AOC is relatively flat, with an average elevation of about 15 feet above sea level. The AOC is accessed by a railroad track from the northeastern side of Parcel 19 or by a path that was cleared from the eastern side of Parcel 14 and then enters Parcel 19. An approximately 10-foot high slope rises to a level plateau west of the railroad spur. The area between the railroad spur and including the southern portion of the AOC is heavily covered by phragmite vegetation, which stands approximately 8 to 10 feet high. The northern half of the AOC is covered with leafy underbrush and young trees with 2- to 6-inch diameter trunks. The western side of the AOC abuts against the Brandywine Creek and is approximately 8 to 10 feet above the creek water line during low tide. The alleged fill area may

encompass the area between the eastern bank of the Brandywine Creek and the slope adjacent to the railroad spur (SATA, 1999b).

The Brandywine Creek flows into the Christina River downstream of the site. The Brandywine Creek has its headwater in the Piedmont Plateau in Pennsylvania, which defines the border between Chester County and Delaware County in Pennsylvania and enters Delaware just north of Beaver Valley. The creek meanders through Wilmington until it joins the Christina River which then joins the Delaware River southeast of Wilmington (Wik, 1996).

2.5 Local Geology

The Geology of the Wilmington Area, Delaware Geologic Map Series Number 4 geologic map prepared by the Delaware Geologic Survey indicates that the 12th Street Landfill Site is located on the border of the Piedmont Physiographic Province and the Atlantic Coastal Plain. The contact, referred to as the fall line, is located approximately 2,000 feet north of the 12th Street Landfill Site (Wik, 1996).

The bedrock at the Site consists of metaigneous and metasedimentary rocks of the Wilmington Complex. The composition is primarily hypersthene-quartz-andesine gneiss with minor amounts of biotite and magnetite. Regolith overlying the bedrock of the area reportedly varies from 0-20 feet (Wik, 1996).

2.6 Regional Hydrogeology

The unconsolidated aquifer overlying the bedrock generally forms at the base of the regolith, directly above the unweathered bedrock. The aquifer typically acts as an unconfined aquifer. The piedmont aquifers are complex and unpredictable due to the variability of fractures. The rock units of the Piedmont are relatively impermeable, except where weathering or fracturing has taken place (Wik, 1996).

2.7 Local Hydrogeology

Due to the variability of the regolith thickness and its limited vertical extent in the vicinity of the site, water yields are expected to be low. Groundwater at the Site is tidal influenced. The tide level for this area fluctuates 6.5 feet between low tide and high tide (SATA, 1998). During the first phase of the removal assessment, water levels in the test pits ranged between approximately 7 to 8 feet below ground surface (bgs) in the central and southern sections of the AOC to approximately 13 feet bgs in the northwestern section of the AOC. One test pit (18 feet deep) in the northern section of the AOC did not encounter any groundwater.

There are no public supply or private home wells that are used for either domestic or potable purposes located within four miles of the Site (SATA, 1999a).

3.0 SAMPLING ACTIVITIES

3.1 Objective

The objectives of this sampling event are to determine:

- The lateral extent of contamination on and off site.

- How serious the potential environmental impact is.
- To aid in the decision to devise an immediate solution to the problem.
- To calculate the volume of contaminated soil.
- If sediment samples have elevated levels of hazardous substances then to subsequently collect fish and shellfish tissue/bio-assay samples.

3.2 Scope of Work

Sediment samples will be collected between the creek bank and the rip rap line along the eastern side of the Brandywine Creek, adjacent to the Site. Sediment samples will be collected at spacing intervals of 50 feet between each location. One location will be adjacent to the creek bank and one location will be collected adjacent to the rip rap line. Sampling will extend both 100 feet upstream of the northern extent of the observed fill and 100 feet downstream of the southern extent of the observed fill.

Surface soil and subsurface soil samples will be collected throughout the Site between the creek bank and eastward, toward 12th Street, to determine the lateral extent of the soil contamination. Sampling locations will be set up on a grid system with sampling nodes spaced at 100-foot intervals. However, the samples will be concentrated along the creek bank and the eastern side of the eastern extent of fill.

Proposed sample locations are illustrated in Figure 3, Sample Location Map.

3.3 Data Use

The data will be used to characterize the extent of the contamination and the potential environmental threat through migration of hazardous substances from contaminated soil and deteriorated buried drums. The analytical data will be compared to emergency removal guidelines (ERGs) and other applicable guidance.

The data will be utilized to support the decision to initiate an EPA removal action at the site.

3.4 Soil Sampling

Surface soil samples will be collected from the ground surface from each grid node. Subsurface soil samples will also be collected from selected grid nodes. A hand auger will be used to obtain the subsurface soil samples. The sampling will extend eastward and southward from the creek bank until the fill material is no longer encountered. The ash-like material, if encountered, will be collected from the hand auger borehole locations, otherwise the material overlying the natural marsh deposits will be sampled for chemical analysis. In addition, soil samples will be collected beyond the visible toe of the fill area to determine if hazardous substances have migrated into the adjacent natural soils. Samples will be collected from as many as 29 sample locations (38 soil samples). For samples collected from 0 to 6 inches deep, collection will be conducted in accordance with SATA SOP No. 302, Surface Soil Sampling, by a SATA member (SATA, 1998).

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Fig. 3

The subsurface soil samples will be collected in accordance with SATA SOP No. 304, Subsurface Soil Sampling, by a SATA member (SATA, 1998).

3.5 Sediment Sampling

Sediment samples will be collected from areas upstream and downstream, i.e. tidal locations, along the Brandywine Creek. One sediment sample will be collected adjacent to the creek bank and one sediment sample will be collected adjacent to the rip rap line (approximately 20 feet apart). The sample locations will be collected at spacing intervals of 50 feet along the eastern side of the Brandywine Creek, during low tide. The sample locations will also be staggered to eliminate any large gaps between the locations. Sampling will extend both 100 feet upstream of the northern extent of observed fill and 100 feet downstream of the southern extent of observed fill. Sediment samples will be collected in accordance with SATA SOP No. 303, Sediment Sampling (SATA, 1998).

3.6 Background Samples

The surface and subsurface soil background samples will be collected from an undisturbed area located on site. The sediment background sample will be collected at the Brandywine Creek State Park, which is located approximately 6-miles upstream of the site. The background samples will be collected in accordance with SATA SOPs for that particular media, by a SATA member.

4.0 ANALYTICAL PARAMETERS

All samples collected in relation to the 12th Street Landfill Site will be identified with the sample prefix "TS" in addition to the sample type specification (see Table 1). Also, the sample numbering will begin where the first phase removal assessment sampling numbering left off. The sediment samples will be identified as SED followed by a sequential number (beginning with TS-SED-03). To designate the sediment samples located adjacent to the creek bank an odd number will be used as the numerical identifier. To designate the sediment samples located adjacent to the rip-rap line an even number will be used as the numerical identifier. The surface soil samples will be identified as SS followed by a sequential number (beginning with TS-SS-06). The subsurface soil samples will be identified as SB followed by a sequential number (beginning with TS-SB-04). All of the samples will be sent to the Delaware Department of Natural Resources and Environmental Control (DNREC) on-site laboratory and minimally screened for lead using their x-ray fluorescence (XRF) instrument. In addition, 20% of the samples (randomly chosen) will be analyzed for lead by a SATA subcontracted laboratory or an EPA contract laboratory program (CLP) lab to confirm the accuracy of the screening samples by DNREC. Also, 10 randomly chosen samples will be collected and analyzed for Target Analyte List (TAL) metals and Target Compound List (TCL) semivolatiles by the SATA subcontracted laboratory or the EPA CLP laboratory. It is anticipated that as many as 36 sediment samples will be collected. It is anticipated that as many as 29 surface soil samples and 9 subsurface soil samples will be collected.

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The sample matrices to be collected, parameters to be analyzed, analysis methods, sample containers needed, and detection limits required are also provided in Table 1 for all samples.

Table 1
Analytical Parameters

Sample Location	Matrix	Analytical Parameter	Test Method	Containers Used Preservatives Used	Detection Limits
TS-SED-03 through TS-SED-38, TS-SS-06 through TS-SS-34, TS-SB-04 through TS-SB-12, TS-FD-01 through TS-FD-08	Sediment/ Soil	Lead	DNREC XRF instrument	1 4-oz wide mouth glass jar	2.7 ppm
20% of the samples, to be randomly determined in the field.	Sediment/ Soil	Lead	CLP SOW ILM04.0	1 8-oz wide mouth glass jar	CRDL
10 random samples to be determined in field.	Sediment/ Soil	Total Metals	CLP SOW ILM04.0	1 8-oz wide mouth glass jar	CRDL
10 random samples to be determined in field.	Sediment/ Soil	Semi-volatile Organic Compounds	CLP SOW OLM03.2	1 8-oz wide mouth glass jar	CRDL
TS-RB-01	Water	Semi-Volatile Organic Compounds	CLP SOW OLM03.2	2 1-L amber glass jar	CRDL
		Total Metals	CLP SOW ILM04.0	1 1-L poly, HNO_3 pH<2	CRDL
TS-BG-01, TS-BG-02, and TS-BG-03	Soil/ Sediment	Total Metals	CLP SOW ILM04.0	1 8-oz wide mouth glass jar	CRDL
TS-BG-01, TS-BG-02, and TS-BG-03	Soil/ Sediment	Semi-volatile Organic Compounds	CLP SOW OLM03.2	1 8-oz wide mouth glass jar	CRDL

SS = Surface Soil SB = Subsurface Soil FD = Field Duplicate RB = Rinsate Blank
BG-01 = Background surface soil BG-02 = Background subsurface soil BG-03 = Background sediment
HNo3 = Nitric Acid SOW = Statement of Work OLM = Organic Low method # ILM = Inorganic Low Method #
CRDL = Contract Required Detection Limit DNREC = Delaware Department of Natural Resources and Environmental Control

5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROCEDURES

This sampling plan is designed to satisfy the Office of Emergency and Remedial Response Data Quality Objectives for Superfund, EPA/540/R-93/078, PB94/963204, September 1993.

5.1 Quality Control of Field Activities

The SATA Site Leader will be responsible for ensuring that sample quality and integrity are maintained in accordance with the SATA Quality Assurance Project Plan. Field quality control (QC) will consist of eight field duplicates, one rinsate blank, and sample documentation as referenced in SATA SOP No. 103, Chain of Custody Documentation and SATA SOP No. 101, Logbook Documentation (SATA, 1998). The rinsate blank will be collected to test for the effectiveness of decontamination procedures. Field duplicate samples will test the reproducibility of sampling procedures and results.

5.2 Sample Packaging and Storage

Sample containers will be labeled and shipped with a sample label affixed to each container. Samples will be placed in plastic zipping bags. Bagged containers will be placed in appropriate transport containers and the containers will be packed with appropriate absorbent material, such as vermiculite, and preserved with ice, if necessary. All sample documents will be affixed to the underside of each transport container lid. The lid will be sealed with shipping tape, and custody seals will be affixed to the transport container. Transport containers will be labeled with the origin and destination locations.

Regulations for packaging, marking, labeling, and shipping of hazardous materials and wastes are promulgated by the U.S. Department of Transportation (DOT). Air carriers which transport hazardous materials, in particular, Federal Express, require compliance with the current International Air Transport Association (IATA) Regulations, which apply to the shipment and transport of hazardous materials by air carrier, if applicable. SATA will follow IATA regulations to ensure compliance.

5.3 Laboratory QC

Laboratory QC will consist of all QC stated in the Contract Laboratory Program (CLP) Statement of Work (SOW) and include all forms and deliverables required in the SOW.

5.4 Data Validation

Data validation will be performed by SATA or by EPA Region III Quality Assurance members in accordance with EPA Region III Modifications to the EPA CLP National Functional Guidelines for Data Review. If SATA performs the data validation a data quality report will be submitted to the EPA.

6.0 INVESTIGATIVE DERIVED WASTE (IDW) PLAN

Investigative derived wastes (IDW) include personal protective equipment (PPE) and disposable sampling equipment (DSE). PPE and DSE will be decontaminated and rendered non-hazardous. All dry PPE and DSE will be double-bagged and disposed as dry industrial waste.

7.0 FIELD ACTIVITIES

Field activities will be scheduled after EPA approval of this sampling plan. Field work will begin with a site reconnaissance to familiarize the sampling team with the sampling locations. If necessary, this sampling plan will be modified in accordance with the site-specific conditions encountered to ensure that the sampling objectives are met. SATA members will collect the samples and complete all necessary documentation, prepare the samples, and pack the samples for shipment. All sampling will be conducted in accordance with SATA SOPs.

8.0 PROJECT MANAGEMENT

The SATA Site Leader will manage the project by coordinating with the EPA OSC, scheduling field activities and personnel requirements, and directing and overseeing all on-site and off-site activities associated with this project. The SATA Site Leader will document and manage all collected samples.

9.0 FIELD EQUIPMENT/HEALTH AND SAFETY

All field activities will be conducted in accordance with the SATA team's health and safety plan. Level D PPE will be worn during the site reconnaissance, and on-site soil and water sampling activities, unless air monitoring results warrant an upgrade to Level C or Level B PPE.

10.0 PROJECT SCHEDULE

The field activities for this site are currently anticipated to begin on 10 January 2000. When sampling activities are completed, a trip report will be drafted. The completion of the draft trip report will depend upon the validation of analytical results by SATA. In the event that hazardous substances are present, the EPA may initiate a removal action at the site to mitigate the threat posed to public health or welfare and the environment.

11.0 REFERENCES

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